

**DEPARTMENT OF COMMERCE**

**National Institute of Standards and Technology**

**Docket No.:** 090318324-9325-01.

RIN: 0693-ZA89

Technology Innovation Program (TIP) Notice of Availability of Funds and Announcement of Public Meeting (Proposers' Conference)

**AGENCY:** National Institute of Standards and Technology (NIST), Department of Commerce

**ACTION:** Notice

**SUMMARY:** The National Institute of Standards and Technology's (NIST) Technology Innovation Program (TIP) announces that it will hold a single fiscal year 2009 competition and is soliciting high-risk, high-reward research and development (R&D) proposals for financial assistance. TIP also announces that it will hold a public meeting (Proposers' Conference) for all interested parties. TIP is soliciting proposals under this fiscal year 2009 competition in two areas of critical national need entitled "Civil Infrastructure" and "Manufacturing" as described in the Program Description section below.

**DATES:** The due date for submission of proposals is 3 p.m. Eastern Time, Tuesday, June 23, 2009. This deadline applies to any mode of proposal submission, including paper and electronic. Do not wait until the last minute to submit a proposal. TIP will not make any allowances for late submissions, including incomplete Grants.gov registration or delays by guaranteed overnight couriers. To avoid any potential processing backlogs due to last minute registrations, proposers are strongly encouraged to start their Grants.gov registration process at least four weeks prior to the proposal submission due date. Review, selection, and award processing is expected to be completed by the end of November 2009.

**ADDRESSES:** Proposals must be submitted to TIP as follows:

**Paper submission:** Send to National Institute of Standards and Technology, Technology Innovation Program, 100 Bureau Drive, Stop 4701, Gaithersburg, MD 20899-4701.

**Electronic submission:** [www.grants.gov](http://www.grants.gov).

**FOR FURTHER INFORMATION CONTACT:** Barbara Cuthill at 301-975-3273 or by e-mail at [barbara.cuthill@nist.gov](mailto:barbara.cuthill@nist.gov).

**SUPPLEMENTARY INFORMATION**

Additional Information. The full Federal Funding Opportunity (FFO) announcement for this request for proposals contains detailed information and requirements for the program. Proposers are strongly encouraged to read the FFO in developing proposals. The full FFO announcement text is available at <http://www.grants.gov> and on the TIP Web site at <http://www.nist.gov/tip/helpful.html>. In addition,

proposers are directed to review the March 2009 Technology Innovation Program Proposal Preparation Kit available at <http://www.nist.gov/tip/helpful.html>. The TIP Proposal Preparation Kit must be used to prepare a TIP proposal. The TIP implementing regulations are published at 15 C.F.R. Part 296, and included in the TIP Proposal Preparation Kit as Appendix B.

Public Meeting (Proposers' Conference). TIP is holding a public meeting (Proposers' Conference) at NIST to provide general information regarding TIP, to offer guidance on preparing proposals, and to answer questions. Proprietary technical discussions about specific project ideas with NIST staff are not permitted at this conference or at any time before submitting the proposal to TIP. Therefore, proposers should not expect to have proprietary issues addressed at the proposers' conference. Also, NIST/TIP staff will not critique or provide feedback on project ideas while they are being developed by a proposer. However, NIST/TIP staff will answer questions about the TIP eligibility and cost-sharing requirements, evaluation and award criteria, selection process, and the general characteristics of a competitive TIP proposal at the Proposers' Conference and by phone and email. Attendance at the TIP proposers' conference is not required.

The TIP Proposers' Conference is being held on the following date, time, and location:

**April 8, 2009, 9 a.m. - 1 p.m. Eastern Time:** NIST Red Auditorium, 100 Bureau Drive, Gaithersburg, MD. **Pre-registration is required by 5 p.m. Eastern Time on April 6, 2009 for the Proposers' Conference being held at NIST Gaithersburg, MD.** Due to increased security at NIST, **NO on-site registrations** will be accepted and all attendees **MUST** be pre-registered. Photo identification must be presented at the NIST main gate to be admitted to the April 8, 2009 conference. Attendees must wear their conference badge at all times while on the NIST campus. **Electronic Registration at:** <https://rproxy.nist.gov/CRS/>.

No registration fee will be charged at the Proposers' Conference. Presentation materials from the Proposers' Conference will be made available on the TIP Web site.

TIP may schedule additional Proposers' Conferences at other locations throughout the country. If this occurs, notices will be posted on the TIP Web site at [www.nist.gov/tip](http://www.nist.gov/tip) and grants.gov Web site and in the Federal Register.

Statutory Authority. Section 3012 of the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science (COMPETES) Act, Pub. L. 110-69 (August 9, 2007), 15 U.S.C.A. §278n (2008).

CFDA. 11.616, Technology Innovation Program

Program Description. TIP is soliciting proposals under this fiscal year 2009 competition in two areas of critical national need entitled "Civil Infrastructure" and "Manufacturing" as described below.

### **Area of Critical National Need 1: Civil Infrastructure**

The objective of this competition is to provide civil infrastructure managers with tools to better manage the structural integrity of elements of the civil infrastructure. Two elements of the societal challenge of managing the Structural Integrity of the United States' Infrastructure will be addressed as outlined in the white paper "Advanced Sensing Technologies and Advanced Repair Materials for the Infrastructure: Water Systems, Dams, Levees, Bridges, Roads, and Highways" ([www.nist.gov/tip/comp09\\_home.html](http://www.nist.gov/tip/comp09_home.html)).

Solutions to this societal challenge require advancement beyond the current practice and state-of-the-art of sensing technologies and repair/retrofit technologies. Sensing advancements are needed to assess the structural integrity and/or deterioration processes of water mains, wastewater collection systems, dams, levees, navigation lock structures, bridges, roads, and highways. Sensing technologies must be more accurate in their determinations of structural integrity, easier to use, and more economically feasible. The increased information obtained from new sensing technologies will lead to better prioritization of repair schedules; however, prioritization is only the first step in a management strategy. Efficient infrastructure management requires that once a structural defect is detected, an economical repair be made. Advancing the technologies of repairing infrastructure elements in contact with water, in contact with salts (road salt or marine environments), and subjected to thermal changes requires transformative research to significantly extend the lifetimes of repairs, lower the costs of repairs, and provide repair technologies that are suitable for a wide range of conditions. For the scope of this competition, "retrofit" refers to the fitting into or onto a structure already in existence and that is in service or can be returned to service by repair. A retrofit material or application can be one that returns the infrastructure element to original specifications or that improves the performance of the infrastructure element beyond the specifications of the original construction. Novel materials and the novel methods to deploy the new materials, constituting repair/retrofit systems, can serve to help meet the societal challenge of better managing the structural integrity of civil infrastructure.

The need for advanced sensing technologies and advanced repair/retrofit materials is of national importance because nearly all municipalities and states in the nation face infrastructure management challenges. TIP's investment is justified because portions of infrastructure are reaching the end of their life spans and there are few cost effective technical means to monitor infrastructure integrity and to prioritize and implement long lived repair/retrofit of the wide variety of constructions of infrastructure elements. Transformational research beyond incremental advancements is required to achieve the objectives for this area of critical national need. Incremental improvements of current technologies will not meet the challenges of providing cost-effective, widely deployable solutions to the problems faced by infrastructure managers.

### **Element 1 – Inspection and/or Monitoring Technologies**

Proposals are being sought to create and validate new, advanced, robust, network capable, nondestructive evaluation and test sensing systems, or system components, to cost effectively and quantitatively inspect and evaluate the structural integrity of civil infrastructure elements of water and wastewater mains, dams, levees, navigation lock structures, bridges, roads and highways. The targeted system should be capable of, but not limited to, detection of corrosion, cracking, delamination and other relevant modes of failure of critical infrastructure elements and the materials of which they are made.

Solutions are needed for improved inspection systems for water and wastewater mains, dams, levees, navigation lock structures, bridges, roads, and highways, where these systems provide real-time understanding of the integrity and service life through the use of portable, mobile or remote sensing capabilities. Innovations are being sought in all aspects of a system to provide an advanced, cost effective, networked system, either fixed or mobile, that is easily deployable, self powered, and self monitoring. A complete system could include all system components, hardware, and software. In addition, the systems may, or may not, need to be underwater in order to assess underwater integrity issues.

Proposals should include validation of the effectiveness of the new technology in actual environmental use conditions with potential end user(s) of the technology.

Eligible projects that are also within the scope of this element are:

- Systems that provide new and advanced methodologies for the detection of fluid leaks from water piping systems.
- Single novel components of a system solution that include a validation of the component in a system setting.
- Inspection systems for structural components located below a water surface in part, or in whole, and susceptible to failure caused by scour, impact, degradation and/or some other subsurface mode of failure.

Ineligible projects under this element include:

- Advancements in a system component without a prototype for validating that the component is functional within a system solution, as part of the proposed technical plan.
- Straightforward improvements to existing components or materials without the potential for a transformational increase in performance to the technical requirements.
- Integration projects using only existing state-of-the-art components or materials.
- Software development that is predominantly straightforward, routine data gathering using applications of standard software development practices.

## **Element 2 – Repair/Retrofit Material and Application Technologies**

Proposals are also being sought to create novel technologies for repair or retrofit of existing civil infrastructure elements already identified above. These new technologies could be considered as consisting of two parts: a novel material and the application or deployment system for installing or placing the novel material. These novel materials and application/deployment technologies are to provide much longer-lived repairs than current repair materials and/or greater performance characteristics than current repair/retrofit methods and/or the original construction.

A proposal for development of a new material, or a novel combination of materials that results in a transformational solution for cost-effective repair/retrofit that includes a novel technology for achieving the repair or retrofit will be considered as having strong potential.

Proposals should include validation of the effectiveness of the new technology in actual environmental conditions with potential end user(s) of the technology.

Eligible projects that are within the scope of this element are:

- The combination of a novel material, or a novel combination of materials, combined with a novel application or installation technology.
- A novel application technology that incorporates an existing material, or combination of materials, from material domains outside those normally used within civil infrastructure, or that incorporates a material or combination of materials, from a domain of materials normally used within civil infrastructure. To be considered competitive, there must be a transformational expansion of applicability of the materials. An example of a project within scope would be a robotic system capable of lining water mains with a material to restore the strength of a deteriorated main to the originally specified burst strength.

- A novel material, or a combination of novel materials, that can be applied with existing application technologies, or that requires minor adjustments to existing application technologies. An example of a project within scope would be a novel reinforcing material combined with a novel compressive matrix material that could be applied using current construction practices.

Ineligible projects under this element are:

- Novel materials, or combinations of materials, that apply only to new construction or primarily to new construction.
- A novel material, or novel combination of materials, for which there is not a deployment technology and no deployment technology approach is included in the proposed research.
- Training or training systems for repair/retrofit installation of novel materials or of current materials.
- Novel systems to deploy repair/retrofit materials, where the materials are both not novel and without a history of being long-lived repair solutions.
- Novel repair parts or assemblies that do not incorporate a novel material, for example: a new type of retrofit stirrup or bracing made from current, conventional materials or combinations of materials.

## **Area of Critical National Need 2: Manufacturing**

The goal of the research outcome/impacts from this competition is to provide manufacturers and end users improved access to adequate quantities of advanced materials at competitive costs that allow evaluation and utilization of these materials in innovative ways. TIP's funding strategy for this competition will emphasize two important elements: 1) *Process scale-up, integration, and design for advanced materials*; and 2) *Predictive modeling for advanced materials and materials processing*. These two elements of the societal challenge of accelerating the use of advanced materials will be addressed as outlined in the white paper "*Accelerating the Incorporation of Materials Advances into Manufacturing Processes*" ([www.nist.gov/tip/comp09\\_home.html](http://www.nist.gov/tip/comp09_home.html)).

Materials performance is often a critical consideration and controlling factor in the innovation process. For example, high strength alloys, aluminum, and magnesium are used to build stronger, lighter and safer vehicles; superalloys are used to make higher efficiency gas turbines; composites make larger, more efficient wind turbine blades and provide improved performance in aerospace applications; and nanomaterials are finding their way into better performing batteries, energy storage devices, high voltage transmission lines and healthcare applications (e.g. imaging). Sustainable materials development and materials substitutions are additional examples where greater capabilities are critical to ongoing or increased competitiveness of U.S. innovations.

Without the ability to produce these new materials and to rapidly integrate them into products while maintaining the material's unique properties, the U.S. will lose these value-added manufacturing innovations to overseas competition, a trend which has already occurred in so many industries. Outlined in this announcement are two key areas related to the manufacturability of advanced materials and descriptions of the supporting technical challenges that need to be addressed.

If successful, the manufacturing solutions envisioned would have the potential to ***create significant performance improvements in new products by accelerating the utilization of an advanced material's new functionality***.

For purposes of this area of critical national need, the term "advanced materials" refers to materials that have unique functionalities but require improved controls and measurements to achieve desired

functionalities in a revolutionary and cost-effective way. The unique functionality that these materials could bring to new products will require new levels of understanding in the sciences of materials processing and process control. For example, in nanomaterials, manipulation and measurement at the atomic level will be needed. In alloys, the control and measurement would be at the microscale (and eventually at the nanoscale) with an emphasis on anisotropic features of the micro (nano) structure. In composites, control and measurement would be at the mesoscale and would take advantage of the anisotropic layering of the process. Control of one material or phase within another will also be an important consideration.

There are additional classes of materials (e.g., polymers, ceramics, etc.) that could be included in this discussion. However, the three classes of materials described above are considered to be most critical to emerging or other potential growth areas for manufacturing and will be the focus of this area of critical national need. *Therefore, this competition is limited to nanomaterials; superalloys, alloys and smart materials; and composites.*

Manufacturing, like so many other areas of critical national need, has a variety of challenges that need to be addressed. TIP's funding strategy for this competition will emphasize two important elements: 1) *Process scale-up, integration, and design for advanced materials*; and 2) *Predictive modeling for advanced materials and materials processing*.

#### **Element 1 - Process scale-up integration and design for advanced materials**

New materials typically are developed in a laboratory setting in progressively larger quantities, and then samples are given to end-users for alpha and beta testing. It can take considerable time and experimentation to understand how the materials can be incorporated into a new product in a way that maintains and utilizes its unique functionality. Time is also needed to effectively integrate the processes that scale-up from laboratory quantities to commercial amounts for more efficient production. This scale-up is often non-linear and does not follow straightforward scaling laws due to the unique functionality that has been designed into the advanced materials.

#### **Element 2 - Predictive modeling tools for advanced materials and materials processing**

Predictive modeling capabilities are key to developing new processes, scaling-up these processes and understanding how to utilize an advanced material's unique functionality. Modeling capabilities are needed to:

- Analyze and understand why a newly discovered material does what it does and then extrapolate its behavior to new conditions, and
- Incorporate this knowledge into process design tools so new products can quickly be made while maintaining the unique functionality of the materials.

To successfully address the proposed challenges for "*Accelerating the Integration of Materials Advances into Manufacturing Processes*," research in new technologies will be needed. The table below illustrates the relationship between key challenges. The three columns of material types (nanomaterials, superalloys and composites) are arranged in order of increasing microstructural size. TIP expects proposed solutions to the challenges to map into one or more of the blank cells in the table, for the proposal to be within scope for funding under this area of critical national need.

Technological Needs		Nanomaterials	Superalloys, Alloys & Smart Materials	Composites
Materials Processing	Scale-up from Laboratory Quantities / Controls			
	Incorporate into New Uses / Maintain Functionality			
Predictive Modeling Tools	Rules / Understand Why It Does What It Does			
	Process Modeling / Design & Product Design Tools			

For **Element 1- Process scale-up, integration and design for advanced materials**, new processes will need to be developed. These processes will increase to commercial scale the quantity and quality of available advanced materials; or help incorporate these advanced materials into new, revolutionary products based on a new material's properties. These scaled-up processes may be a next generation or an entirely new process. For example, forging ever larger parts cannot be solved by building ever larger forges (which become prohibitively expensive), but instead by new partial forging techniques.

In support of these new processes, new instrumentation and measurement capabilities will also be needed. These instruments will need to measure real time process parameters such as the properties that provide the unique capabilities of the advanced materials (e.g., composition). In addition, instruments for real time inspection are needed to ensure and/or verify materials are being correctly incorporated into manufactured products that require the revolutionary functions of these new materials.

Proposals addressing **process scale-up, integration and design for advanced materials** will be considered eligible if they consist of:

- A single process to achieve the goals of the scale-up, or ones that consist of one or more processes integrated together into a coherent solution;
- Scale-up of materials processes to manufacture and apply coatings that are within the three eligible material types (nanomaterials; superalloys, alloys and smart materials; and composites); or
- Scale-up of materials processes for healthcare applications (e.g. imaging).

Eligible proposals addressing **process scale-up, integration and design for advanced materials** must address **all** of the following issues:

- Address one or more of the materials areas:
  - nanomaterials;
  - superalloys, alloys, and smart materials; and/or
  - composites;
- Quantify the baseline processing capabilities;
- Describe how the results of the process scale-up could lead to new products and manufacturing process capabilities; and
- Quantification and qualification of the estimated output of the final project results.

In addition, proposals for **process scale-up** must address **both** of the following issues:

- Scale-up of the quantities produced during the project must be targeted to increase by a factor of 1,000 fold or more (unit quantity per unit time) as compared to the baseline; and
- A detailed scientific rationale and description of the challenges to accomplish scale-up of the process(es).

Proposals addressing ***process scale-up, integration and design of advanced materials*** will be considered more competitive if they:

- Include validation methodologies by or with processors or end users; and/or
- Address sustainability issues.

Proposals addressing ***process scale-up, integration and design for advanced materials*** will be considered ineligible if they:

- Have the primary focus of the proposal on the following materials:
  - materials derived from a biological source;
  - a pure ceramic, glass (including metallic glass), or polymer; or
  - primarily an electronic or photonic material.
- Focus primarily on the application of material coatings.

For **Element 2 - Predictive modeling for advanced materials and materials processing**, new tools are needed to enable researchers to use constitutive relations and rules (with validation) concerning the underlying behavior of materials (understanding structure vs. function) and the changes to behavior due to manufacturing processes. For example, new tools will need to account for the scale-dependent behavior of advanced materials. This capability will enable a better and quicker understanding of why materials do what they do. These efforts will also enable extrapolation of that knowledge beyond the laboratory conditions for which they were developed, and therefore will need new validation and verification capabilities.

In addition, critical knowledge is also needed about why certain decisions or assumptions were made in order to incorporate new modeling capabilities for laboratory results into process design and modeling. Again, new validation and verification methodologies will be essential.

With successful development of these tools, processes, and technologies, the manufacturing communities will have significantly improved capabilities to quickly incorporate advanced materials breakthroughs into revolutionary products based on new materials functionality, and thus establish new competitive advantages in a global economy.

Eligible proposals addressing ***predictive modeling for advanced materials and materials processing*** must address **all** of the following issues:

- Address one or more of the eligible materials areas:
  - nanomaterials;
  - superalloys, alloys, and smart materials; and/or
  - composites;
- Quantify the baseline modeling capability; and
- Describe how the results of the proposed modeling capabilities could lead to new products and manufacturing process capabilities.



Proposals for ***predictive modeling for advanced materials and materials processing*** must address **one or both** of the following:

- Develop constitutive relationships and rules that describe the behavior and the process of the materials at a level that is useful for describing laboratory results, as well as for developing a greater understanding of the materials for end users; and/or
- Develop or use the constitutive relationships and rules to develop process design tools for the manufacturing processes for these advanced materials.

Proposals addressing ***predictive modeling for advanced materials and materials processing*** will be considered more competitive if they address:

- Collaboration by or with those who manufacture the advanced materials, in order to validate the models; and/or
- How users will specifically benefit from the acceleration and implementation of the proposed models in support of materials reliability (i.e. final properties or mechanical performance) and materials behavior before and after processing.

Proposals addressing ***predictive modeling for advanced materials and materials processing*** that do not include validation of models will be considered less competitive.

Proposals addressing ***predictive modeling for advanced materials and materials processing*** will be considered ineligible that:

- Have the primary focus of the modeling effort on the following materials:
  - materials derived from a biological source;
  - a pure ceramic, glass (including metallic glass), or polymer; or
  - primarily an electronic or photonic material;
- Focus primarily on the application of material coatings.

An additional key characteristic that ***all manufacturing proposals must address*** is how the outcomes of the research will enable manufacturers to produce advanced materials faster, better and cheaper, as well as enable the new uses for the advanced materials.

### **Additional Requirements for All Manufacturing Proposals**

***Ineligible projects*** under this area of critical national need include:

- Projects whose principal focus is on discovery of new materials;
- Efforts related to the physical extraction of raw materials;
- Straightforward improvements to existing processes or materials without the potential for a transformational increase in performance to the technical requirements;
- Integration projects using only existing state-of-the-art processes, models or materials; or
- Software development that is predominantly straightforward, routine data gathering using applications of standard software development practices.

### **Additional Requirements for All Manufacturing and Civil Infrastructure Proposals**

In addition to the competition-specific ineligible projects, the following are ineligible projects:

- Straightforward improvements of existing products or product development.
- Projects that are Phase II, III, or IV clinical trials. TIP will rarely fund Phase I clinical trials and reserves the right not to fund a Phase I clinical trial. The portion of a Phase I trial that may be funded must be critical to meeting evaluation criterion (a)(1) addressing the scientific and technical merit of the proposal. The trial results must be essential for completion of a critical R&D task of the project. The definitions of all phases of clinical trials are provided in the TIP Guidelines and Documentation Requirements for Research Involving Human & Animal Subjects located at <http://www.nist.gov/tip/helpful.html>.
- Pre-commercial-scale demonstration projects where the emphasis is on demonstrating that some technology works on a large scale or is economically sound rather than on R&D that advances the state of the art and is high-risk, high-reward.
- Projects that TIP determines would likely be completed without TIP funds in the same time frame or nearly the same time frame, or with the same scale or scope.
- Predominantly straightforward, routine data gathering (e.g., creation of voluntary consensus standards, data gathering/handbook/specification sheet preparation, testing of materials, or unbounded research aimed at basic discovery science) or application of standard engineering practices.
- Projects in which the predominant risk is market oriented—that is, the risk that the end product may not be embraced by the marketplace.
- Projects with software work, that are predominantly about final product details and product development, and that have significant testing involving users outside the research team to determine if the software meets the original research objectives, are likely to be either uncompetitive or possibly ineligible for funding. However, R&D projects with limited software testing, involving users outside of the research team, or vertebrate animals, may be eligible for funding and contain eligible costs within a TIP award when the testing is critical to meeting evaluation criteria and/or award criteria and the testing results are essential for completion of a critical task in the proposed research. This type of testing in projects may also be considered to involve human subjects or vertebrate animals in research and require compliance with applicable federal regulations and NIST policies for the protection of human subjects or live vertebrate animals.

Unallowable/Ineligible Costs. The following items, regardless of whether they are allowable under the federal cost principles, are ineligible/unallowable under TIP:

- a. Bid and proposal costs unless they are incorporated into a federally-approved indirect cost rate (e.g., payments to any organization or person retained to help prepare a proposal).
- b. Construction costs for new buildings or extensive renovations of existing buildings. However, costs for the construction of experimental research and development facilities to be located within a new or existing building are allowable provided the equipment or facilities are essential for carrying out the proposed project and are approved in advanced by the NIST Grants Officer. These types of facility costs may need to be prorated if they will not be used exclusively for the research activities proposed.
- c. Contractor office supplies and contractor expenses for conferences/workshops.
- d. Contracts to another part of the same company or to another company with identical or nearly identical ownership. Work proposed by another part of the same company or by another company with identical or nearly identical ownership should be shown as funded through inter-organizational transfers that do not contain profit. Inter-organizational transfers should be broken down in the appropriate budget categories.

- e. For research involving human and/or animal subjects, any costs used to secure Institutional Review Board or Institutional Animal Care and Use Committee approvals before or during the award.
- f. General purpose office equipment and supplies that are not used exclusively for the research: e.g., office computers, printers, copiers, paper, pens, and toner cartridges.
- g. Indirect costs, which must be absorbed by the recipient. However, indirect costs are allowable for contractors under a single company or joint venture. (Note that indirect costs absorbed by the recipient may be used to meet the cost-sharing requirement.)
- h. Marketing, sales, or commercialization costs, including marketing surveys, commercialization studies, and general business planning, unless they are included in a federally approved indirect cost rate.
- i. Office furniture costs, unless they are included in a federally approved indirect cost rate.
- j. Patent costs and legal fees, unless they are included in a federally approved indirect cost rate.
- k. Preaward costs: i.e., any costs incurred prior to the award start date.
- l. Profit, management fees, interest on borrowed funds, or facilities capital cost of money. However, profit is allowable for contractors under a single company or joint venture.
- m. Project development planning (e.g. patent and literature searches) and creation of milestones. For example, proposals that plan on developing milestones only if an award is received and after literature searches are performed under the award are generally not competitive. Costs for literature searches in general are ineligible.
- n. Relocation costs, unless they are included in a federally approved indirect cost rate.
- o. Salaries: NIST limits the salaries of project personnel to not exceed Level I of the Executive Schedule (\$196,700 as of January 1, 2009, <http://www.opm.gov/oqa/09tables/html/ex.asp>).
- p. Tuition costs. An institution of higher education participating in a TIP project as a contractor or as a joint venture member or lead may charge TIP for tuition remission or other forms of compensation in lieu of wages paid to students working on TIP projects, but only as provided in OMB Circular A-21, Section J.41. In such cases, tuition remission would be considered a cash contribution rather than an in-kind contribution.

**Funding Availability.** Fiscal year 2009 appropriations include funds in the amount of approximately \$25 million for new TIP awards. Approximately \$10 million is available for the Civil Infrastructure area of critical national need and approximately \$15 million is available in the Manufacturing area of critical national need. Approximately 25 total awards are anticipated. The anticipated start date is January 1, 2010. The period of performance depends on the R&D activity proposed. A single company can receive up to a total of \$3 million with a project period of performance of up to 3 years. A joint venture can receive up to total of \$9 million with a project period of performance of up to 5 years. Continuation funding after the initial award is based on satisfactory performance, availability of funds, continued relevance to program objectives, and is at the sole discretion of NIST.

**Eligibility Criteria.** Single companies and joint ventures may apply for TIP funding as provided in 15 C.F.R. §§296.2, 296.4, and 296.5.

**Large-sized Company Participation.** A large-sized company is not eligible to apply for TIP funding. A large-sized company is defined as any business, including any parent company plus related subsidiaries, having annual revenues in excess of \$1.63 billion. This number is based on the May 2008 issue of *Fortune* magazine's Fortune 1000 list. (Note that the revenue amount will be updated annually and will be noted in future annual announcements of availability of funds.)

**Cost-Sharing Requirements.** Proposers must provide a cost share of at least 50 percent of the yearly total project costs (direct plus all of the indirect costs).

**Evaluation and Award Criteria.** Proposals are selected for funding based on the evaluation criteria listed in 15 C.F.R. §296.21 and the award criteria listed in 15 C.F.R. §296.22 as identified below. Additionally, no proposal will be funded unless TIP determines that it has scientific and technical merit and that the proposed research has strong potential for addressing a societal challenge within the TIP-identified area of critical national need as described in this notice. Detailed guidance on how to address the evaluation and award criteria is provided in Chapter 2 of the TIP Proposal Preparation Kit, which is available at <http://www.nist.gov/tip/helpful.html>.

**Evaluation Criteria.** The two components of the evaluation criteria and respective weights as listed in 15 C.F.R. §296.21 are as follows:

(a)(1) The proposer(s) adequately addresses the scientific and technical merit and how the research may result in intellectual property vesting in a United States entity including evidence that:

- (i) The proposed research is novel;
- (ii) The proposed research is high-risk, high-reward;
- (iii) The proposer(s) demonstrates a high level of relevant scientific/technical expertise for key personnel, including contractors and/or informal collaborators, and has access to the necessary resources, for example research facilities, equipment, materials, and data, to conduct the research as proposed;
- (iv) The research result(s) has the potential to address the technical needs associated with a major societal challenge not currently being addressed; and
- (v) The proposed research plan is scientifically sound with tasks, milestones, timeline, decision points and alternate strategies.

(2) Total weight of (a)(1)(i) through (v) is 50%.

(b)(1) The proposer(s) adequately establishes that the proposed research has strong potential for advancing the state-of-the-art and contributing significantly to the United States science and technology knowledge base and to address areas of critical national need through transforming the Nation's capacity to deal with a major societal challenge(s) that is not currently being addressed, and generate substantial benefits to the Nation that extend significantly beyond the direct return to the proposer including an explanation in the proposal:

- (i) Of the potential magnitude of transformational results upon the Nation's capabilities in an area;
- (ii) Of how and when the ensuing transformational results will be useful to the Nation; and
- (iii) Of the capacity and commitment of each award participant to enable or advance the transformation to the proposed research results (technology).

(2) Total weight of (b)(1)(i) through (iii) is 50%.

**Award Criteria.** The six components of the award criteria as listed in 15 C.F.R. §296.22 are as follows:

(a) The proposal explains why TIP support is necessary, including evidence that the research will not be conducted within a reasonable time period in the absence of financial assistance from TIP;

(b) The proposal demonstrates that reasonable and thorough efforts have been made to secure funding from alternative funding sources and no other alternative funding sources are reasonably available to support the proposal;

(c) The proposal explains the novelty of the research (technology) and demonstrates that other entities have not already developed, commercialized, marketed, distributed, or sold similar research results (technologies);

(d) The proposal has scientific and technical merit and may result in intellectual property vesting in a United States entity that can commercialize the technology in a timely manner; and

(e) The proposal establishes that the research has strong potential for advancing the state-of-the-art and contributing significantly to the United States science and technology knowledge base; and

(f) The proposal establishes that the proposed transformational research (technology) has strong potential to address areas of critical national need through transforming the Nation's capacity to deal with major societal challenges that are not currently being addressed, and generate substantial benefits to the Nation that extend significantly beyond the direct return to the proposer.

NIST must determine that a proposal successfully meets all six award criteria for the proposal to receive funding under the Program.

Selection Factors. In making final selections, the Selecting Official will select funding recipients based upon the Evaluation Panel's rank order of the proposals and the following selection factors:

- a. Assuring an appropriate distribution of funds among technologies and their applications,
- b. Availability of funds, and/or
- c. Program priorities.

Program Priorities. TIP is soliciting proposals under this fiscal year 2009 competition in two areas of critical nation need entitled "Civil Infrastructure" and "Manufacturing" as described in the Program Description section above.

Selection Procedures. Proposals are selected based on a multi-disciplinary peer-review process, as described in 15 C.F.R. §296.20. A preliminary review is conducted to determine if the proposal is in accordance with 15 C.F.R. §296.3; complies with the eligibility requirements described in 15 C.F.R. §296.5; addresses award criteria (a) through (c) of 15 C.F.R. §296.22; was submitted to a previous TIP competition, and if so, has been substantially revised; and is complete. Proposals that are incomplete or do not meet any one of the preliminary review requirements will normally be eliminated. All remaining proposals are then carefully reviewed based on the TIP evaluation criteria listed in 15 C.F.R. §296.21 and award criteria listed in 15 C.F.R. §296.22. An Evaluation Panel consisting of federal employees will present funding recommendations to a Selecting Official in rank order for further consideration. The Selecting Official makes the final selections for funding. The selection of proposals by the Selecting Official is final and cannot be appealed. The final approval of selected proposals and award of assistance will be made by the NIST Grants Officer. The award decision of the NIST Grants Officer is final and cannot be appealed.

NIST reserves the right to negotiate the cost and scope of the proposed work with the proposers that have been selected to receive awards. This may include requesting that the proposer delete from the scope of work a particular task that is deemed by NIST to be inappropriate for support. NIST also reserves the right to reject a proposal where information exists that raises a reasonable doubt as to the responsibility of the proposer.

Intellectual Property Requirements. For single company award recipients, pursuant to the Bayh-Dole Act (35 U.S.C. 202 (a) and (b)) and “Memorandum to the Heads of Executive Departments and Agencies: Government Patent Policy” (February 18, 1983), the entity that invents owns the invention. However, pursuant to 35 U.S.C. 202(a)(i), when a single company or its contractor under a TIP award is not located in the United States or does not have a place of business located in the United States or is subject to the control of a foreign government, NIST will require that title to inventions made by such parties be transferred to a United States entity that will ensure the commercialization of the technology in a timely fashion.

For joint ventures, ownership of inventions arising from a TIP-funded project may vest in any participant in a joint venture, as agreed by the members of the joint venture (notwithstanding 35 U.S.C. 202 (a) and (b)). (Participant includes any entity that is identified as a recipient, subrecipient, or contractor on an award to a joint venture.)

Title to any such invention shall not be transferred or passed, except to a participant in the joint venture, until the expiration of the first patent obtained in connection with such invention.

Should the last existing participant in a joint venture cease to exist prior to the expiration of the first patent obtained in connection with any invention developed from assistance provided under TIP, title to such patent must be transferred or passed to a U.S. entity that can commercialize the technology in a timely fashion.

The United States reserves a nonexclusive, nontransferable, irrevocable paid-up license, to practice or have practiced for or on behalf of the United States any intellectual property developed from a TIP award. The federal government shall not in the exercise of such license publicly disclose proprietary information related to the license. This does not prohibit the licensing to any company of intellectual property rights arising from a TIP-funded project. (15 C.F.R. §296.11(b)(3)). The federal government also has march-in rights in accordance with 37 C.F.R. §401.6. *Intellectual property* means an invention patentable under title 35, United States Code, or any patent on such an invention, or any work for which copyright protection is available under title 17, United States Code. (15 C.F.R. §296.2.)

Projects Involving Human Subjects. Research involving human subjects must be in compliance with applicable Federal regulations and NIST policies for the protection of human subjects. Human subjects research activities involve interactions with live human subjects or the use of data, images, tissue, and/or cells/cell lines (including those used for control purposes) from human subjects. Research involving human subjects may include activities such as the use of image and/or audio recording of people, taking surveys or using survey data, using databases containing personal information, testing software with volunteers, and many tasks beyond those within traditional biomedical research. A Human Subjects Determination Checklist is included in the March 2009 TIP Proposal Preparation Kit in Chapter 4 (<http://www.nist.gov/tip/helpful.html>) to assist you in determining whether your proposed research plan has human subjects involvement, which would require additional information in your proposal submission, and possibly more documentation during the Evaluation Panel’s consideration of your proposal. See the *TIP Guidelines and Documentation Requirements for Research Involving Human & Animal Subjects* for more specific information on documentation requirements and due dates for documentation located at <http://www.nist.gov/tip/helpful.html> or by calling 1-888-847-6478. President Obama has issued Exec. Order No. 13,505, 74 Fed. Reg. 10667 (March 9, 2009), revoking previous executive orders and Presidential statements regarding the use of human embryonic stem cells in research.

NIST will follow any guidance issued by the National Institutes of Health (NIH) pursuant to the executive order and will develop its own procedures based on the NIH guidance before funding research using human embryonic stem cells. NIST will follow any additional policies or guidance issued by the current Administration on this topic.

Projects Involving Live Vertebrate Animals. Research involving live vertebrate animals must be in compliance with applicable federal regulations and NIST policies for the protection of live vertebrate animals. Vertebrate animal research involves live animals that are being cared for, euthanized, or used by the project participants to accomplish research goals or for teaching or testing. The regulations do not apply to animal tissues purchased from commercial processors or tissue banks or to uses of preexisting images of animals (e.g., a wildlife documentary or pictures of animals in newscasts). The regulations do apply to any animals that are transported, cared for, euthanized or used by a project participant for testing, research, or training such as testing of new procedures or projects, collection of biological samples or observation data on health and behavior. Detailed information regarding the use of live vertebrate animals in research plans and required documentation is available in the *TIP Guidelines and Documentation Requirements for Research Involving Human & Animal Subjects* located at <http://www.nist.gov/tip/helpful.html> or by calling 1-888-847-6478.

Executive Order 12372 (Intergovernmental Review of Federal Programs). Proposals under this program are not subject to Executive Order 12372.

Administrative Procedure Act and Regulatory Flexibility Act. Prior notice and comment are not required under 5 U.S.C. § 553, or any other law, for rules relating to public property, loans, grants, benefits or contracts (5 U.S.C. §553(a)). Because prior notice and an opportunity for public comment are not required pursuant to 5 U.S.C. §553 or any other law, the analytical requirements of the Regulatory Flexibility Act (5 U.S.C. *et seq.*) are inapplicable. Therefore, a regulatory flexibility analysis is not required and has not been prepared.

E.O. 13132 (Federalism). This notice does not contain policies with Federalism implications as defined in Executive Order 13132.

E.O. 12866 (Regulatory Planning and Review). This notice is determined to be not significant under Executive Order 12866..

Paperwork Reduction Act. Notwithstanding any other provision of the law, no person is required to, nor shall any person be subject to penalty for failure to, comply with a collection of information, subject to the requirements of the Paperwork Reduction Act (PRA), unless that collection of information displays a currently valid Office of Management and Budget (OMB) Control Number. This notice contains collection-of-information requirements subject to the PRA. The use of Form NIST-1022, Standard Form-424 (R&R), SF-424B, SF-LLL, Research and Related Other Project Information Form, and CD-346 has been approved by OMB under the respective control numbers 0693-0050, 4040-0001, 4040-0007, 0348-0046, 4040-0001, and 0605-0001.

Administrative and National Policy Requirements. Department of Commerce Pre-Award Notification Requirements for Grants and Cooperative Agreements, 73 Fed. Reg. 7696-05 (Feb. 11, 2008), apply to this solicitation. On the form SF-424 (R&R) item 3. Organization DUNS and item 6. Employer Identification (EIN) or (TIN), the applicant's 9-digit Dun and Bradstreet Data Universal Numbering System (DUNS) and the applicants 9-digit Employer Identification Number (EIN) or Taxpayer Identification Number (TIN) must be consistent with the information on the Central Contractor

Registration (CCR) ([www.ccr.gov](http://www.ccr.gov)) and Automated Standard Application for Payment System (ASAP). For complex organizations with multiple DUNS and EIN or TIN numbers, the DUNS and EIN or TIN numbers MUST be the numbers for the applying entity. Entities that provide incorrect/inconsistent DUNS and EIN or TIN numbers may experience significant delays in submitting their proposals through Grants.gov and receiving funds if the proposal is selected for funding.

Dated: March 25, 2009

Patrick Gallagher  
Deputy Director